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Kaduna State, Nigeria's leisure and polo horses were analyzed for obesity and risk factors

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Abstract

Little is known about equine obesity in Nigeria, despite rising worries about the dangers it poses to horses' health. The purpose of this research was to identify the incidence of obesity in horses used for recreation and polo in Kaduna State, Nigeria, and the variables that contribute to its development. It was a cross-sectional study. Using a modified Henneke technique (1-9 scale), we determined whether or not 116 horses were overweight (defined as a body condition score of 7 or below). Age, breed, and sex were recorded, and a systematic questionnaire was used to collect data on diet and care. Logistic regression analysis was used to evaluate potential causes of obesity. Twelve percent of the horses in the study were overweight or obese (14/116). Obesity was more common among horses used for recreation (21%) than among polo horses (3%). Being a stallion (21.4%), not being exercised (66.7%), being chained to a stake in the ground (23.2%), and being given concentrates ad libitum (21.4%) all raised the likelihood that a horse would be overweight. In order to educate owners on how to minimize the prevalence of horse obesity and the danger of illnesses like laminitis and insulin dysregulation, we need to know the prevalence of obesity in this group and the risk factors connected with it.

Keywords: obesity; insulin dysregulation; equine metabolic syndrome; laminitis; horse.

1. Introduction

Excessive fat storage that may eventually pose health risks is what we mean when we talk about obesity. Laminitis, oxidative stress, inflammation, excessive cholesterol, insulin resistance, and the equine metabolic syndrome (EMS) are all linked to it, making it a significant cause for worry among horse owners (Johnson et al., 2010). Adipocytes, the fat cells that make up adipose tissue, are endocrine cells. Inflammatory cytokines and hormones produced by adipose tissue have been linked to insulin resistance (Johnson et al., 2009). High blood sugar, or hyperglycaemia, is a serious health risk brought on by insulin resistance. When blood sugar levels get too high, the pancreas releases more insulin to flush it out of circulation. Laminitis is one consequence that has been linked to hyperinsulinaemia (high insulin levels in the blood; de Laat et al., 2010). Akinniyi et al. (2023) found that laminitis affected 61.29 percent of EMS-affected horses in Nigeria.

Despite growing awareness of the negative effects obesity may have on animal welfare, data on the incidence of obesity in Nigerian horses used for recreation and polo, as well as the factors that enhance their susceptibility to gaining weight, are few. The prevalence of obesity and conditions like EMS may be reduced by focused education of owners on management strategies, which can be facilitated through the identification of risk factors.

The purpose of this research was to assess the frequency of obesity in horses used for recreation and polo in Kaduna State, Nigeria, and to identify potential risk factors for this condition.Tools and techniques.

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2 .Materials and methods

2.1 Study area

The study was conducted in Zaria and Igabi Local Gov- ernment Areas (LGAs) of Kaduna State, Nigeria.

2.2 Study Design and sample size

A cross-sectional study was conducted. A total of 116 horses were sampled (50 leisure horses and 66 polo horses).

a. Body condition scoring

A body condition score (BCS) (1–9) was used to meas- ure obesity as described by Henneke et al. (1983) and modi- fied by Kohnke (1992). To assess accumulated fat, both visual inspection and palpation of the neck, ribs, withers, area behind the shoulder, loin, and tailhead were carried out on the horses. A numerical value (1–9) was assigned based on the fat accumulated in all the listed areas. After each area was assessed and assigned a score, an average of all the scores was obtained to get the horse's final overall score, which was rounded up or down to the nearest half-score to obtain each BCS (Kohnke, 1992). The BCS was carried out by a highly experienced veterinarian. Based on the BCS, the horses were classified as under-condition (< 4.5), moderate condition (4.5–5.5), over-condition (6–6.5), and obese con- dition (≥ 7) (Dugdale et al., 2012).

b. Risk factors

Age, breed, and sex were all documented. The method used to determine age was based on dentition, as described by Richardson et al. (1995). A structured questionnaire was used to collect information on housing, exercise, and con- centrate feeding.

c. Data analysis

The obtained data were summarised and presented in ta- bles using descriptive statistics to compute prevalence. The odds ratio, using logistic regression, was used to determine the strength of the risk factors. Confidence intervals of 95 % were calculated, and values of $P \leq 0.05$ were considered significant. The Statistical Package for Social Sciences (SPSS®, version 26) was used.

d. Ethical statement

The Ahmadu Bello University Committee on Animal Use and Care (ABUCAUC) granted ethical permission for the study with the approval code ABUCAUC/2022/042

3. Results and discussion

3.1 Demographics

A total of 116 horses were sampled: 56 leisure horses and 60 polo horses. There were 70 (60.3 %) local horse breeds and 46 (39.7 %) Argentine polo ponies. There were 56 (48.3 %) stallions and 60 (51.7 %) mares. In terms of age, 42 (36.2 %) horses were < 5 years old, 67 (57.8 %) horses were between 5 and 15 years old, and 7 (6.0 %) hors- es were > 15 years old. Fifty-six (48.3 %) horses were teth- ered to a stake in the ground, and 60 (51.7 %) were stabled. Six (5.2 %) horses had no history of exercise, and 110 (94.8 %) horses had a history of exercise. Fifty-six (48.3 %) horses were fed concentrates *ad libitum*, 19 (16.4 %) horses were fed concentrates twice a day, and 41 (35.3 %) horses were fed concentrates thrice a day.

3.2 Distribution of Obesity

Of the 116 horses examined, a total of 16 (13.8 %), 61 (52.6 %), 25 (21.6 %), and 14 (12.1 %) were in under condi- tion, moderate condition, over condition, and obese condi- tion, respectively (Table 1).

3.3 Prevalence of Obesity

The result showed the prevalence of obesity in leisure horses to be 21.4 % (12/56) and in polo horses to be 3.3 % (2/60). The overall prevalence of obesity in this study was 12.1% (14/116) (Table 2).

3.4 Risk factors

A Univariable logistic regression analysis identified sev- eral risk factors. Regarding breed, local horse breeds (18.6 %) were 10.26 times more likely to be obese than Argentine polo ponies (2.2 %), and the relationship was significant (OR 10.26, 95 % CI [1.29; 81.43], P = 0.028). In terms of sex, stallions (21.4 %) were 7.91 times more likely to be obese than mares (3.3 %), and the relationship was significant (OR 7.91, 95 % CI [1.68; 37.17], P = 0.009). In terms of age, horses within the age range of 5 to 15 years (14.9 %) were 1.67 times more likely to be obese than hors- es aged < 5 years (9.5 %). The relationship was not signifi- cant (OR 1.67, 95 % CI [0.49; 5.70], P = 0.416). Concerning housing, tethered horses (23.2 %) were 17.89 times more likely to be obese than stabled horses (1.7 %), and the rela- tionship was significant (OR 17.89, 95 % CI [2.25; 141.5], P = 0.006). In terms of exercise, horses not exercised (66.7 %) were 20 times more likely to be obese than horses exercised (9.1 %), and the relationship was significant (OR 20, 95 % CI [3.25; 123.14], P = 0.001). Regarding concen-

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trate feeding, horses fed concentrate *ad libitum* (21.4 %) were 10.01 times more likely to be obese than horses fed concentrate twice a day (2.4 %), and the relationship was significant (OR 10.01, 95% CI [1.36; 87.71], *P = 0.025*) (Table 3).

Table 1

Body condition score distribution of leisure and polo horses in Kaduna State, Nigeria

Horse	BCS				
	UC (< 4.5)	MC (4.5-5.5)	OC (6-6.5)	ObC (≥ 7)	Total
	No. (%)	No. (%)	No. (%)	No. (%)	No. (%)
Leisure	16 (28.6)	19 (33.9)	9 (16.1)	12 (21.4)	56 (100)
Polo	0 (0)	42 (70)	16 (26.7)	2 (3.3)	60 (100)
Total	16 (13.8)	61 (52.6)	25 (21.6)	14 (12.1)	116 (100)

BCS = Body Condition Score, UC = Under condition, MC = Moderate condition, OC = Over condition, ObC = Obese condition

Table 2

Prevalence of equine obesity in leisure and polo horses, Kaduna State, Nigeria

Horse	No. of horses sampled	No. of obese horses	Prevalence of obesity (%)
Leisure	56	12	21.4
Polo	60	2	3.3
Overall	116	14	12.1

Table 3

The prevalence of equine obesity with respective categories of the risk factors in both leisure and polo horses, Kaduna State, Nigeria

Risk factors	No. of sampled horse	No. of obese horses	Prevalence (%)	OR (95% Cl)	P value
Breed					
• LHB	70	13	18.6	10.26 (1.29; 81.43)	0.028*
• APP	46	1	2.2	Reference	
Sex					
• Stallion	56	12	21.4	7.91 (1.68; 37.17)	0.009*
• Mare	60	2	3.3	Reference	
Age					
• < 5 years	42	4	9.5	Reference	
• 5 to 15 years	67	10	14.9	1.67 (0.49; 5.70)	0.416
• > 15 years	7	0	0	-	-
Housing					
• Tethered	56	13	23.2	17.89 (2.25; 141.5)	0.006*
• Stabled	60	1	1.7	Reference	
Exercise					
• No	6	4	66.7	20 (3.25; 123.14)	0.001*
• Yes	110	10	9.1	Reference	
Concentrate feeding					
• *Ad libitum*	56	12	21.4	10.01 (1.36; 87.71)	0.025*
• Twice a day	41	1	2.4	Reference	
• Thrice a day	19	1	5.3	2.22 (0.13; 37.55)	0.580

LHB = Local horse breed, APP = Argentine polo pony, * = Significant

1.1 Discussion

Our study provides important information regarding the prevalence and risk factors for obesity

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in both leisure and polo horses based on body condition scoring (BCS) in Ka- duna State, Nigeria. The overall prevalence of obesity in the present study is lower than in previous studies in different populations of horses and ponies in various countries (Wyse et al., 2008; Stephenson et al., 2011; Thatcher et al., 2012; Jensen et al., 2016; Potter et al., 2016), which may be ac- counted for by differences in study populations, sampling methods, and body condition scoring methods. The preva- lence of obesity in polo horses (3.3 %) was lower than in leisure horses (21.4 %). A possible explanation could be that polo horses participate in more intense activities and are more athletic than leisure horses, which decreases their risk of obesity. Similar findings have been reported by Robin et al. (2015).

The current study identified breed as a risk factor for obesity, with local horse breeds having significantly greater odds of being obese than Argentine polo ponies. The results are consistent with the previous reports of Pratt-Phillips et al. (2010) and Thatcher et al. (2012).

Sex was also identified as a risk factor for obesity; stal- lions had significantly greater odds of being obese than mares. However, Thatcher et al. (2012) reported that mares had significantly greater odds of being obese than stallions, while Potter et al. (2016) and Kosolofski et al. (2017) re- ported that sex did not influence the likelihood that a horse would be obese. Stallions having greater odds of being obese than mare in the present study could be due to the fact that most of the stallions are leisure horses.

There was no significant association between age and the prevalence of equine obesity in this study, suggesting that horses in the three age groups kept under similar conditions were equally susceptible to obesity. This agrees with a simi- lar finding by Kosolofski et al. (2017).

The greater odds of obesity in tethered horses could be because they have more restricted movement (physical ac- tivity) than horses turned into paddocks or pastures. The greater odds of obesity in horses who were not exercised are consistent with the widely held belief that exercise is an important component of weight management and weight loss regimens for horses (Powell et al., 2002; Stewart-Hunt et al., 2006). However, Kosolofski et al. (2017) observed that exercise was not connected to the horse's BCS, which he attributed to factors such as misclassification of exercise intensity, a relatively small sample size, and the potential variability among clinicians' scores leading to BCS misclas- sification.There are significantly higher odds of obesity among horses fed concentrate *ad libitum*. This is because horses are overfed without exercise, and excess fat accumulates. The quantity of feed intake for those fed twice and three times a day was well regulated.

2. Conclusions

Our findings demonstrate that a large proportion of the horses in Kaduna State, Nigeria, were obese, with most of the obese horses being leisure horses. This highlights the need to promote awareness among the horse community that obesity, especially among leisure horses, is a matter of con- cern. Veterinarians must educate caregivers on body condi- tion scoring and weight management to reduce the preva- lence of obesity and associated health risks such as laminitis and insulin dysregulation.

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